SERVICE NEWS

FUJI HEAVY INDUSTRIES LTD.
HEAD OFFICE ; SUBARU BLDG.
SHINJUKU, TOKYO, JAPAN

JCAB APPROVED

NO. 200-027 DATE October 10, 2013 (SUPERSEDES NO.)

REV. DATE (SUPERSEDES NO.)

REASON

The Partial Revision for Addition of FA-200 New Alternators

Since design change for addition of new Alternators (P/N:LW-14308 and LW-14371 include Lycoming Pulley (LYC)LW-14313) had approval of JCAB (No.20-16 (June 3, 2013), and No. 22-12 (June 3, 2013)) FA-200 Service Manual and Parts Catalogue has been modified, so we will inform you of the modified contents.

We attached Service Manual and Parts Catalogue separately. Please replace the corresponding pages according to the following points.

1. Service Manual No. — Attached Service Manual Page

(1) FA200-104 ・・・・・・・・・・ PAGE 3〜 6 (4-1, 4-2, 10-9, 10-10)
(2) FA200-105 ・・・・・・・・・・ PAGE 7〜10 (4-1, 4-2, 10-7, 10-8)

2. Parts Catalogue No. — Attached Parts Catalogue Page

(1) FA200-201 ・・・・・・・・・・ PAGE 11〜18 (8-8, 8-9, 8-13, 8-14, 8-15, 8-16, 9-2, 9-3)
(2) FA200-202 ・・・・・・・・・・ PAGE 19〜24 (8-5, 8-6, 8-11, 8-12, 9-2, 9-3)

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CHAPTER 4

ENGINE AND RELATED SYSTEMS

4-1 DESCRIPTION

FA-200-160 is powered by an Avco Lycoming model O-320-D2A, 160 HP and FA-200-180 is powered by an Avco Lycoming model IO-360-B1B, 180 HP.
Both engines are air cooled, horizontal opposed 4 cylinder, direct driven, wet sump engines.
The rated power of O-320-D2A is 160 HP/2,700 rpm and that of IO-360-B1B is 180 HP/2,700 rpm.
The cylinders are numbered as follows: R/H front cylinder… No.1, L/H front cylinder… No.2, R/H rear cylinder… No.3, and L/H rear cylinder… No.4, designated based on the order of connecting rods.
The engine data are shown in para. 4-2. Perform engine checks referring to Chapter 3, Periodic Check Table, Major repairs and overhaul of engines shall be carried out in accordance with Overhaul Manual (P/N 60294-7) issued by Avco Lycoming.

4-2 ENGINE DATA

Aircraft Series	FA-200-160	FA-200-180
AVCO LYCOMING Model	O-320-D2A	IO-360-B1B
Rated Horsepower	160HP/2700 rpm	180HP/2700 rpm
Number of Cylinders	4	4
Displacement, Cubic inches	319.8 IN^3	361.0 IN^3
Bore, inches	5.125 IN	5.125 IN
Stroke, inches	3.875 IN	4.375 IN
Compression Ratio	8.5 : 1	8.5 : 1
Propeller drive ratio	1 : 1	1 : 1
Propeller drive rotation (viewed from rear)	Clockwise	Clockwise
Magnetos (Left)	BENDIX S4LN-21 or Slick 4373	BENDIX S4LN-200 or Slick 4347
Magnetos (Right)	BENDIX S4LN-20 or Slick 4370	BENDIX S4LN-204 or Slick 4370
Firing order	1-3-2-4	1-3-2-4
Spark occurs, degrees BTC	25°	25°
Valve rocker clearance (hydraulic tappets collapsed)	0.28 ～ 0.80IN	0.28 ～ 0.80 IN
Spark plugs GAP	0.018 ～ 0.022IN	0.018 ～ 0.022 IN
Tightening Torque, Spark plugs	360-420 IN-LBS	360-420 IN-LBS

	FA-200-160	FA-200-180
Carburetor (MARVEL SCHEBLER)	MA-4SPA	N/A
Fuel Injector (BENDIX)	N/A	RSA-5AD1
Alternator (LYCOMING or HET or Kerry)	LW-14308 (ALY-8420 or ALY-8520) or LW-14371	LW-14308 (ALY-8420 or ALY-8520) or LW-14371
Starter (PRESTOLITE-12VOLT)	MZ4204	MZ4204
Engine Dry Weight (with Accessories)	278 LBS	295 LBS

4-3 ENGINE COWLING (SEE FIG. 4-1)

The engine cowling consists of the upper cowling and lower cowling. The upper cowling is provided with large access doors on both L/H and R/H sides which can be opened or closed without any tools, facilitating routine oil servicing and inspection of accessories.

4-3-1 REMOVAL OF ENGINE COWLING

The engine cowling is removed by loosening the cowling fasteners and removing the nose cap joint screws and firewall attach screws. Before removing the lower cowling, remove 2 hoses between the cowling and heat exchanger, fuel pump cooling hose and hose for the engine cowling air intake.

4-3-2 INSTALLATION OF ENGINE COWLING

When the cowling is installed, be sure to install the hoses removed. Bend the sealing of the baffles in such a direction (inwards) that air around the engine can flow correctly. Installation is accomplished in the reversed order of the removal procedures.

4-3-3 CLEANING AND INSPECTION OF ENGINE COWLING

Clean the inside of the cowling with cloth moistened with cleanser (Federal Specification P-S-661 or equivalent). If the inside is found smeared with oil, etc., spray cleanser on it, leave it a while as it is, wash it with soapy water to remove all foreign matters and wipe off soapy water with dry cloth. As for the painted surface of the cowling, clean it with neutral cleanser, wash it away with a plenty of water and wax it after washing to extend the durability of the painted surface. After washing, check the cowling for dents, cracks and loose rivets.

Repair all defects discovered so that propagation of such defects to other portions can be prevented.

4-3-4 REPAIR OF ENGINE COWLING

In case the cowling skin is damaged excessively, replace it with new one. In case of small cracks, drill stop holes and small dents can be corrected by hammering from inside.

10-6 ALTERNATOR SYSTEM

10-6-1 GENERAL

The alternator system consists of a belt-driven alternator, a voltage regulator and a condenser to prevent radio interference caused by the alternator. If the alternator goes out of order, the ammeter will present a minus indication.

10-6-2 ALTERNATOR

The belt-driven alternator is located at the front right of the engine. The alternator is cooled with air let in from the front of the engine. The output of this altemator is converted into direct current by a silicon rectifier built into the alternator befor being led out.
One of the outstanding features of this alternator is that a high output can be obtained with the engine in idling condition. Adjustment of the alternator voltage is accomplished by adjusting the strength of rotary magnetic field produced by changes in field current.
The alternator in itself has characteristics to control the maximum current so that it requires no output current control. Therefore, no current regulator is required, although a voltage is required. Because of the silicon rectifier built into the alternator, the flow of current is limited to one direction. Since it accomplishes the function of preventing the flow of reverse current from the battery to the alternator, no cut-out relay is required.

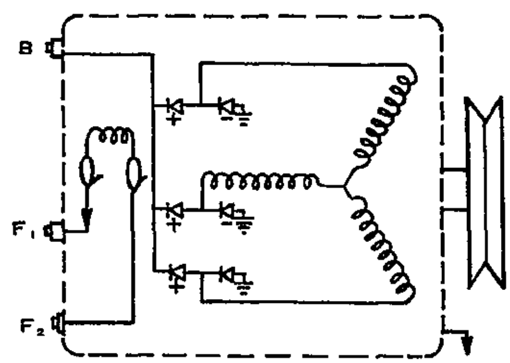


FIG 10-5 ALTERNATOR CIRCUIT

WARNING

The alternator is highly vulnerable to reverse current because of a diode it uses. Since the diode offers high resistance to reverse current, no cut-out relay is usually used. If the polarity of the battery is reversed, there is danger of damage to the diode because of the flow of excessive current, since the diode offers no resistance to the flow of current in forward direction.

10-6-3 VOLTAGE REGULATOR

The voltage regulator is located on the upper left of the fire wall inside the engine room. When the MASTER switch is set to "ON", current is set flowing from the bus bar to the voltage regulator. This voltage regulator is of the transistor type and regulates the alternator output voltage by controlling the field current of the alternator.

10-6-4 VOLTAGE ADJUSTMENT

For voltage adjustment, start the engine, apply 10 to 15A load to the alternator, and operate the engine for approx. one minute.
While leaving the alternator load as it is, set the engine speed at 1,000 r.p.m. and connect a 30 V DC voltmeter between the "I" terminal of the voltage regulator and ground.
Remove the black cap of the voltage regulator under the marking "INCREASE". Adjust the Phillips head screw with a Phillips head screw driver and set the voltage to 14.2V. If the voltage is too low, rotate the screw clockwise. If it is too high, rotate it counter-clockwise.

10-6-5 TROUBLE SHOOTING OF ALTERNATOR SYSTEM

Trouble	Probable Cause	Remedy
1. Ammeter presents zero or minus indication regardless of engine speed.	1. Opened field circuit	1. Set Master switch to "OFF", check all connections of field circuit, and correct.
	2. Opened output circuit	2. Set Master switch to "OFF" check all connections of output circuit, and correct.
	3. Defective voltage regulator or inadequate adjustment.	3. Readjust voltage according to Section 10-6-4 Voltage Adjustment. If voltage is still too low after adjustment, replace voltage regulator.

CHAPTER 4

ENGINE AND RELATED SYSTEMS

4-1 DESCRIPTION

FA-200 airplane is equipped with one of the three different models of Avco Lycoming engines, all of which are air cooled, horizontal opposed 4-cylinder, direct driven, wet sump engines. Engine applicability and related information is provided in the following Engine Data.
The cylinders are numbered as follows: R/H front cylinder… No.1, L/H front cylinder… No.2, R/H rear cylinder… No.3, and L/H rear cylinder… No.4, designated based on the order of connecting rods.
Perform engine checks per Chapter 3, Periodic Check Table. Major repairs and overhaul of engines shall be carried out in accordance with Overhaul Manual (P/N 60294-7) issued by Avco Lycoming.

4-2 ENGINE DATA

Aircraft Series	FA-200-160	FA-200-180	FA-200-180AO
AVCO LYCOMING Model	O-320-D2A	IO-360-B1B	O-360-A5AD
Rated Horsepower	160HP/2700 rpm	180HP/2700 rpm	180HP/2700 rpm
Number of Cylinders	4	4	4
Displacement, Cubic inches	319.8 IN^3	361.0 IN^3	361.0 IN^3
Bore, inches	5.125 IN	5.125 IN	5.125 IN
Stroke, inches	3.875 IN	4.375 IN	4.375 IN
Compression Ratio	8.5 : 1	8.5 : 1	8.5 : 1
Propeller drive ratio	1 : 1	1 : 1	1 : 1
Propeller drive rotation (viewed from rear)	Clockwise	Clockwise	Clockwise
Magnetos (Left)	BENDIX S4LN-21 or Slick 4373	BENDIX S4LN-200 or Slick 4347	BENDIX D4LN-2021 or D4LN-3000 (Dual Type)
Magnetos (Right)	BENDIX S4LN-20 or Slick 4370	BENDIX S4LN-204 or Slick 4370	
Firing order	1-3-2-4	1-3-2-4	1-3-2-4
Spark occurs, degrees BTC	25°	25°	25°
Valve rocker clearance (hydraulic tappets collapsed)	0.28 ～ 0.80IN	0.28 ～ 0.80 IN	0.28 ～ 0.80 IN
Spark plugs GAP	0.018 ～ 0.022IN	0.018 ～ 0.022 IN	0.018 ～ 0.022 IN
Tightening torque, Spark plugs	360-420 IN-LBS	360-420 IN-LBS	360-420 IN-LBS

	FA-200-160	FA-200-180	FA-200-180AO
Carburetor (MARVEL SCHEBLER)	MA-4SPA	N/A	MA-4-5
Fuel Injector (BENDIX)	N/A	RSA-5AD1	N/A
Alternator (LYCOMING or HET or Kerry)	LW-14308 (ALY-8420 or ALY-8520) or LW-14371	LW-14308 (ALY-8420 or ALY-8520) or LW-14371	LW-14308 (ALY-8420 or ALY-8520) or LW-14371
Starter (PRESTOLITE-12VOLT)	MZ4204	MZ4204	MZ4204
Engine Dry Weight (with Accessories)	286 LBS	295 LBS	299 LBS

4-3 ENGINE COWLING (SEE FIG. 4-1)

The engine cowlings consist of the upper and lower cowlings, both of which are made from glass fiber. The upper cowling is provided with an access door on R/H side to facilitate routine oil servicing and inspection of accessories.

4-3-1 REMOVAL OF ENGINE COWLING

The engine cowling is removed by loosening the cowling fasteners, six upper and six lower, on the fuselage and removing the nose cap joint structure and removing upper and lower cowling attaching fasteners (10ea) and screws (4ea).
Before removing the lower cowling, remove two bonding straps and landing light wiring terminals between the cowling and fuselage.

4-3-2 INSTALLATION OF ENGINE COWLING

When the cowling is installed, be sure to reinstall the bonding jumpers and landing light wiring removed in the above step. Bend the sealing of the baffles in such a direction (inwards) that air around the engine can flow correctly. Installation is accomplished in the reversed order of the removal procedures.

4-3-3 CLEANING AND INSPECTION OF ENGINE COWLING

Clean the inside of the cowling with cloth moistened with cleanser (Federal Specification P-S-661 or equivalent). If the inside is found smeared with oil, etc., spray cleanser on it, leave it a while as it is, wash it with soapy water to remove all foreign matters and wipe off soapy water with dry cloth. As for the painted surface of the cowling, clean it with neutral cleanser, wash it away with a plenty of water and wax it after washing to extend the durability of the painted surface. After washing, check the cowling for dents, cracks and loose rivets.
Repair all defects discovered so that propagation of such defects to other portions can be prevented.

4-3-4 REPAIR OF ENGINE COWLING

In case the cowling skin is damaged excessively, replace it with new one. For repair of minor cracks refer to paragraphs 13-2 and 13-13.

10-5 EXTERNAL POWER SUPPLY RECEPTACLE

The external power supply receptacle (optional equipment) is located on the left-hand side of fuselage above the step, and is used to supplement the battery system for cold weather starting or when performing lengthy electrical maintenance. One of the two larger terminals is grounded, and the other is connected to the starter relay. (Fig. 10-3)

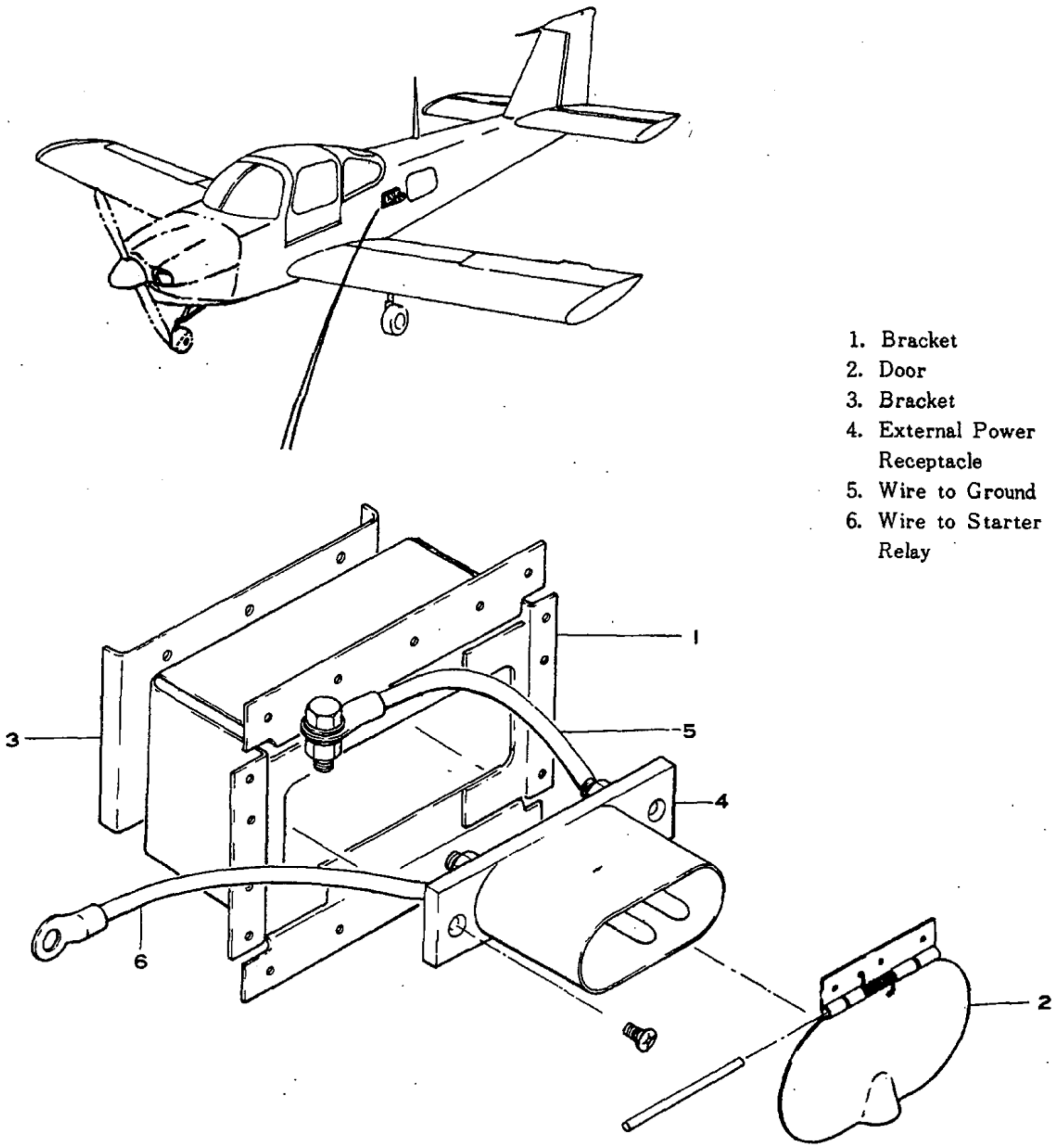


FIG 10-3 EXTERNAL POWER RECEPTACLE

10-6 ALTERNATOR SYSTEM

10-6-1 GENERAL

The alternator system consists of a belt-driven alternator, a voltage regulator and a condenser to prevent radio interference caused by the alternator. If the alternator goes out of order, the ammeter will present a minus indication.

10-6-2 ALTERNATOR

The belt-driven alternator is located at the front right of the engine. The alternator is cooled with air let in from the front of the engine. The output of this alternator is converted into direct current by a silicon rectifier built into the alternator befor being led out.
One of the outstanding features of this alternator is that a high output can be obtained with the engine in idling condition. Adjustment of the alternator voltage is accomplished by adjusting the strength of rotary magnetic field produced by changes in field current.
The alternator in itself has characteristics to control the maximum current so that it requires no output current control. Therefore, no current regulator is required, although a voltage is required.
Because of the silicon rectifier built into the alternator, the flow of current is limited to one direction.
Since it accomplishes the function of preventing the flow of reverse current from the battery to the alternator, no cut-out relay is required.

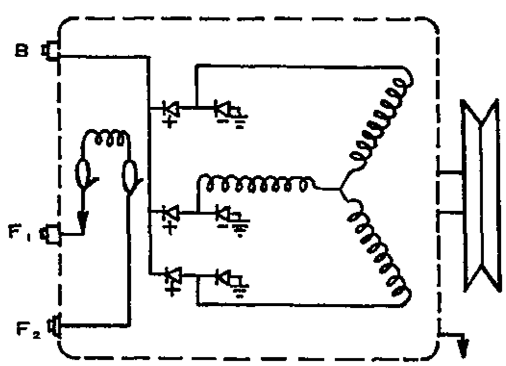
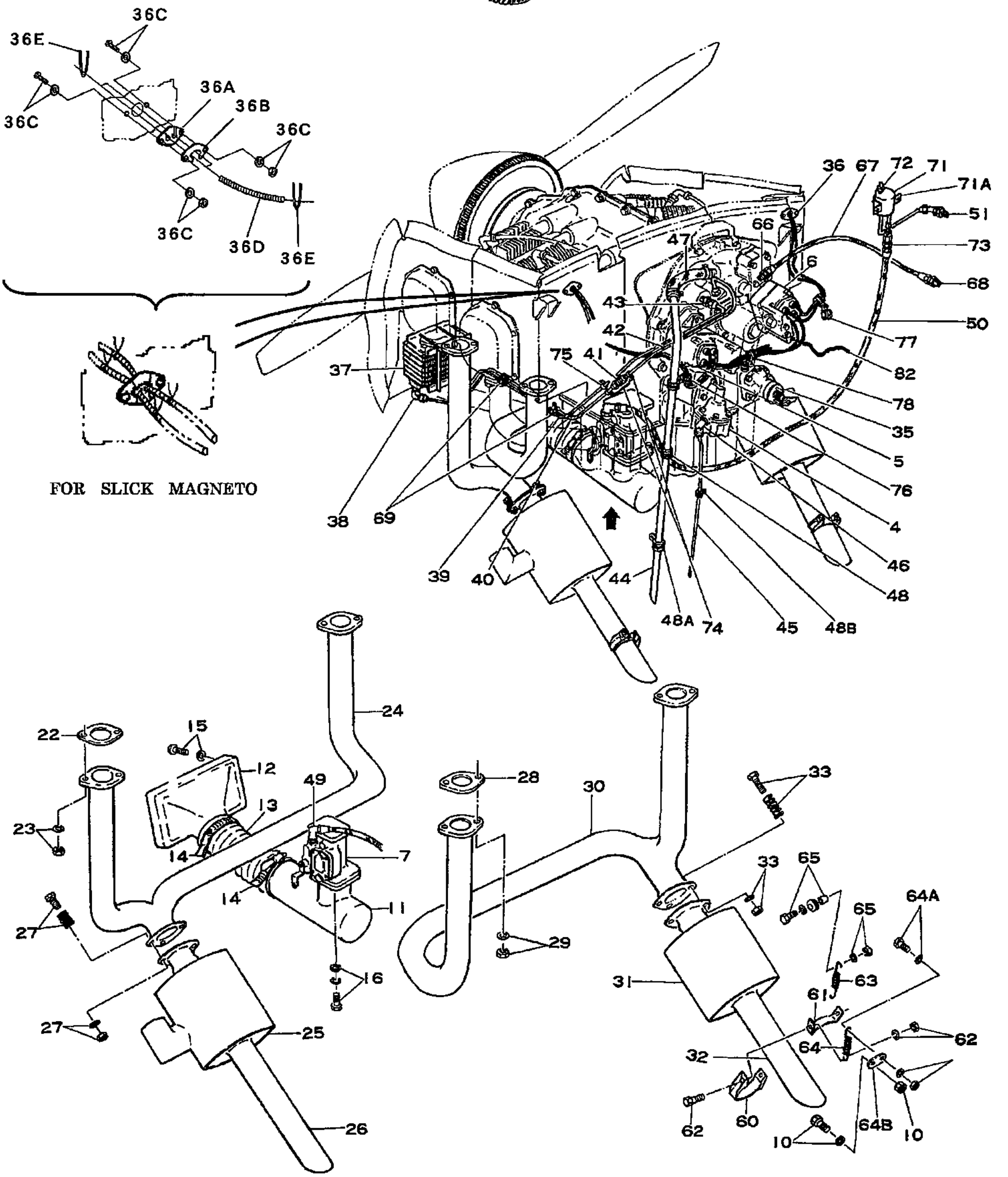


FIG 10-4 ALTERNATOR CIRCUIT

FIG & INDEX NO.	PART NO.	DESCRIPTION 1234567	UNITS PER ASS'Y	USABLE ON CODE
38		POWER PLANT INSTALLATION	REF	
-1	O-320-D2A	·ENGINE ASSY (LYC)	1	
-2	ALZ-8401	··ALTERNATOR, 12V, 50A (PRS)	1	
	or ALZ-8401-R			
	or ALY-8403	··ALTERNATOR, 12V, 60A (PRS)	1	
	or LW-14308	··ALTERNATOR, 12V, 60A (LYC)	1	
		··ALTERNATOR, 12V, 60A (HET or KEL) ALY-8420	1	
		··ALTERNATOR, 12V, 60A (HET or KEL) ALY-8520	1	
	or LW-14371	··ALTERNATOR, 12V, 60A (LYC)	1	
		(SEE FIG.42-8)	REF	
-3	MZ-4206	··STARTER, ENGINE, 12V (PRS)	1	
	or MZ-4206-R			
-4	40295	··PUMP, ENGINE DRIVEN FUEL (AC)	1	
-5	10-51360-30	··MAGNETO, L.H (BX) TYPE S4LN-21	1	
	or 66GC25SFNN	··MAGNETO, L.H (SLK) TYPE 4373	1	
-6	10-51360-29	··MAGNETO, R.H (BX) TYPE S4LN-20	1	
	or 66GP-0SANN	··MAGNETO, R.H (SLK) TYPE 4370	1	
-7	10-3678-32	··CARBURETOR, ENGINE (MRS) MODEL MA-4SPA	1	
-8	J-7402-16	·MOUNT, RUBBER, ENGINE (LO)	4	
	200-914052-001	·STRAP, ENGINE BONDING	2	F
	NAS1307-50D	·BOLT	4	
	or AN7-35			
	AN310-7	·NUT	4	
	AN960-716	·WASHER	8	
	AN960-716L	·WASHER	8	
	AN380-3-4	·PIN, COTTER	4	
-8A	AN960-416	·WASHER	2	H
-8B	200-914053-001	·STRAP ASSY	2	H
	AN4-5A	·BOLT	2	H
	NAS679A4W	·NUT	2	H
	AN960-416	·WASHER	2	H
	AN935-416L	·WASHER	2	H
	MS35338-44	·WASHER	2	H
-9	200-412010-601	·MOUNT ASSY, ENGINE	1	E
	200-412010-611	·MOUNT ASSY, ENGINE	1	G
-10	NAS1305-25D	·BOLT	7	E
	NAS1305-28D	·BOLT, CENTER, LOWER	2	E
	AN310-5	·NUT	9	E
	AN960-516L	·WASHER	9	E
	AN960D516	·WASHER	9	E
	MS24665-136	·PIN, COTTER	9	E
	NAS1305-25D	·BOLT, UPPER	2	G
	NAS1305-25	·BOLT	2	G
	or NAS1305-25D			
	NAS1305-28	·BOLT, CENTER, LOWER	2	G
	or NAS1305-28D			
	AN960-516L	·WASHER	6	G
	AN960D516	·WASHER	4	G
	AN960D516L	·WASHER	2	G
	AN310-5	·NUT, UPPER	2	G
	MS21042-5	·NUT	4	G
	MS24665-136	·PIN, COTTER	2	G
-11	200-914126-001	·VALVE ASSY, ALTERNATE AIR	1	
-12	200-389012-001	·FILTER, CHARGE AIR, ENGINE (AMA)	1	
	or 120009			
-13	SNF-1-1-3.00 -8.50-1.00	·HOSE (SRC)	1	
	or F-0470-760210	·HOSE	1	

FIG & INDEX NO.	PART NO.	DESCRIPTION 1234567	UNITS PER ASS'Y	USABLE ON CODE
38 -14	AN737TW107	·CLAMP	2	
-15	NAS220-25	·SCREW	4	
	AN960-8L	·WASHER	4	
-16	MS20074-04-03	·BOLT, ALTERNATE AIR VALVE INSTL	4	
	AN935-416L	·WASHER	4	
	AN960-416	·WASHER	4	
	MS20995C32	·WIRE	AR	
-17	200-914102-001	·BAFFLE ASSY, ENGINE, L.H FRONT	1	
	MS20074-04-05	·BOLT	4	
	AN960-416	·WASHER	4	
	AN935-416L	·WASHER	4	
-18	200-914103-001	·BAFFLE ASSY, ENGINE, CENTER FRONT	1	
	MS35207-264	·SCREW	6	
	AN960-10L	·WASHER.	6	
-19	200-914104-001	·BAFFLE ASSY, ENGINE, R.H FRONT	1	
	MS20074-04-05	·BOLT	3	
	AN960-416	·WASHER	3	
	AN935-416L	·WASHER	3	
-20	200-914105-001	·BAFFLE ASSY, ENGINE, L.H REAR	1	
	MS20074-04-05	·BOLT	2	
	AN960-416	·WASHER	2	
	AN935-416L	·WASHER	2	
-21	200-914106-001 or 200-914106-101	·BAFFLE ASSY, ENGINE, R.H REAR	1	
	MS20074-04-05	·BOLT	3	
	AN960-416	·WASHER	3	
	AN935-416L	·WASHER	3	
	MS35207-263	·SCREW	2	
	AN960-10L	·WASHER	2	
-22	65321	·GASKET, EXHAUST FLANGE (LYC)	2	
-23	MS51922-11	·NUT	4	
	TM-950016-001	·WASHER	4	
	200-950030-001	·EXHAUST PIPE ASSY, LH, FWD	1	C
	200-950030-005	·EXHAUST PIPE ASSY, LH, FWD	1	D
-24	200-950031-001	··EXHAUST MANIFOLD ASSY, LH	1	
-25	200-950037-001	··COVER ASSY, L.H, HEATER	1	
-26	203-950013-003	··HEAT EXCHANGER & MUFFLER ASSY	1	
-27	AN3-12	··BOLT	3	
	AN310C3	··NUT	3	
	200-950030-011	··WASHER	6	
	AN380-2-3	··PIN, COTTER	3	
	200-914161-003	··SPRING	3	
-28	65321	·GASKET, EXHAUST FLANGE	2	
-29	MS51922-11	·NUT	4	
	TM-950016-001	·WASHER	4	
	200-950030-003	·EXHAUST PIPE ASSY, RH AWD	1	
-30	200-950033-001	··EXHAUST MANIFOLD ASSY, RH	1	
-31	200-950036-002	··COVER ASSY, R.H, HEATER	1	
-32	203-950013-001	··HEAT EXCHANGER & MUFFLER ASSY	1	
-33	AN3-12	··BOLT	3	
	AN310C3	··NUT	3	
	AN380-2-3	··PIN	3	
	200-914161-003	··SPRING	3	
	200-950030-011	··WASHER	6	



FOR FA-200-180

FIGURE 39. ENGINE INSTALLATION (3/2)

ISSUED : JANUARY 2010

FIG & INDEX NO.	PART NO.	DESCRIPTION 1234567	UNITS PER ASS'Y	USABLE ON CODE
39		POWER PLANT INSTALLATION	REF	
-1	IO-360-B1B	·ENGINE ASSY (LYC)	1	
-2	ALZ-8401	··ALTERNATOR, 12V, 50A (PRS)	1	
	or ALZ-8401-R			
	or ALY-8403	··ALTERNATOR, 12V, 60A (PRS)	1	
	or LW-14308	··ALTERNATOR, 12V, 60A (LYC)	1	
		··ALTERNATOR, 12V, 60A (HET or KEL) ALY-8420	1	
		··ALTERNATOR, 12V, 60A (HET or KEL) ALY-8520	1	
	or LW-14371	··ALTERNATOR, 12V, 60A (LYC)	1	
		(SEE FIG.42-8)	REF	
-3	MZ-4206	··STARTER, ENGINE, (12V) (PRS)	1	
	or MZ-4206-R			
-4	40296	··PUMP, ENGINE DRIVEN FUEL (AC)	1	
-5	10-163005-2	··MAGNETO, L.H (BX)		
		TYPE S4LN-200	1	
	or 66GR25SANN	··MAGNETO, L.H (SLK) TYPE 4347	1	
-6	10-163045-3	··MAGNETO, R.H (BX)		
		TYPE S4LN-204	1	
	or 66GP-0SANN	··MAGNETO, R.H (SLK) TYPE 4370	1	
-7	2524147-3	··FUEL INJECTOR (BX)	1	
	or 2524147-5			
-8	J-7402-16	·MOUNT, RUBBER, ENGINE (LO)	4	
	200-914052-001	·STRAP, ENGINE BONDING	2	H
	NAS1307-50D	·BOLT	4	
	or AN7-35			
	AN310-7	·NUT	4	
	AN960-716	·WASHER	8	
	AN960-716L	·WASHER	8	
	AN380-3-4	·PIN, COTTER	4	
-8A	AN960-416	·WASHER	2	J
-8B	200-914053-001	·STRAP, ENGINE BONDING	2	J
	AN4-5A	·BOLT	2	J
	NAS679A4W	·NUT	2	J
	AN960-416	·WASHER	2	J
	AN935-416L	·WASHER	2	J
	MS35338-44	·WASHER	2	J
-9	200-412010-601	·MOUNT ASSY, ENGINE	1	E
	200-412010-611	·MOUNT ASSY, ENGINE	1	F
-10	NAS1305-25D	·BOLT	7	E
	NAS1305-28D	·BOLT, CENTER, LOWER	2	E
	AN310-5	·NUT	9	E
	AN960-516L	·WASHER	9	E
	AN960D516	·WASHER	9	E
	MS24665-136	·PIN, COTTER	9	E
	NAS1305-25D	·BOLT, UPPER	2	F
	NAS1305-25	·BOLT	2	F
	or NAS1305-25D			
	NAS1305-28	·BOLT, CENTER, LOWER	2	F
	or NAS1305-28D			
	AN960-516L	·WASHER	6	F
	AN960-516	·WASHER	4	F
	AN960D516L	·WASHER	2	F
	AN310-5	·NUT, UPPER	2	F
	MS21042-5	·NUT	4	F
	MS24665-136	·PIN, COTTER	2	F
-11	203-914121-017	·VALVE ASSY, ALTERNATE AIR	1	
-12	200-389012-001	·FILTER, CHARGE AIR, ENGINE	1	
	or 120009	(AMA)		
-13	SNF-1-1-3.00	·HOSE (SRC)	1	
	-8.50-1.00			
	or F-0470-760210			
-14	AN737TW107	·CLAMP	2	

FIG & INDEX NO.	PART NO.	DESCRIPTION 1234567	UNITS PER ASS'Y	USABLE ON CODE
39 -15	NAS220-25	·SCREW	4	
	AN960-8L	·WASHER	4	
-16	MS20074-04-03	·BOLT	4	
	AN935-416L	·WASHER	4	
	AN960-416	·WASHER	4	
	MS20995C32	·WIRE	AR	
-17	203-914202-001	·BAFFLE ASSY, ENGINE, L.H FRONT	1	
	MS20074-04-05	·BOLT	4	
	AN960-416	·WASHER	4	
	AN935-416L	·WASHER	4	
-18	200-914103-001	·BAFFLE ASSY, ENGINE CENTER FRONT	1	
	MS35207-264	·SCREW	6	
	AN960-10L	·WASHER	6	
-19	203-914204-001	·BAFFLE ASSY, ENGINE, R.H FRONT	1	
	MS20074-04-05	·BOLT	3	
	AN960-416	·WASHER	3	
	AN935-416L	·WASHER	3	
-20	203-914205-001	·BAFFLE ASSY, ENGINE, L.H REAR	1	
	MS20074-04-05	·BOLT	2	
	AN960-416	·WASHER	2	
	AN935-416L	·WASHER	2	
-21	203-914206-001 or 203-914206-101	·BAFFLE ASSY, ENGINE, R.H REAR	1	
	MS20074-04-05	·BOLT	3	
	AN960-416	·WASHER	3	
	AN935-416L	·WASHER	3	
	MS35207-263	·SCREW	2	
	AN960-10L	·WASHER	2	
-22	65321	·GASKET, EXHAUST FLANGE (LYC)	2	
-23	MS51922-11	·NUT	4	
	TM-950016-001	·WASHER	4	
	200-950030-101	·EXHAUST PIPE ASSY, LH, FWD	1	
-24	200-950031-101	··EXHAUST MANIFOLD ASSY, LH	1	
-25	200-950036-001	··COVER ASSY, L.H, HEATER	1	
-26	203-950013-001	··HEAT EXCHANGER & MUFFLER ASSY	1	
-27	AN3-12	··BOLT	3	
	AN310C3	··NUT	3	
	200-950030-011	··WASHER	6	
	AN380-2-3	··PIN, COTTER	3	
	200-914161-003	··SPRING	3	
-28	65321	·GASKET, EXHAUST FLANGE (LYC)	2	
-29	MS51922-11	·NUT	4	
	TM-950016-001	·WASHER	4	
	200-950030-103	·EXHAUST PIPE ASSY	1	
-30	200-950033-101	··EXHAUST MANIFOLD ASSY	1	
-31	200-950036-002	··COVER ASSY, R.H, HEATER	1	
-32	203-950013-001	··HEAT EXCHANGER & MUFFLER ASSY	1	
-33	AN3-12	··BOLT	3	
	AN310C3	··NUT	3	
	AN380-2-3	··PIN	3	
	200-914161-003	··SPRING	3	
	200-950030-011	··WASHER	6	
-34	F-0175-1.00-10.00 or F-0470-250275	·HOSE, ALTERNATOR COOLING	1	
	MS35207-263	·SCREW	1	
	NAS679A3W	·NUT	1	
	AN735-18	·CLAMP	1	

FIG & INDEX NO.	PART NO.	DESCRIPTION 1234567	UNITS PER ASS'Y	USABLE ON CODE
39 -35	B210452	·GOVERNOR, PROP (WO)	1	
-36	MS35207-263	·SCREW	4	
	NAS679A3W	·NUT	4	
	AN960-10	·WASHER	8	
-36A	200-914101-7	·SEAL	2	
-36B	200-914101-5	·PLATE	2	
		/ ATTACHING PARTS /		
-36C	MS35207-263	·SCREW	2	
	NAS679A3W	·NUT	2	
	AN960-10L	·WASHER	4	
		.... *		
-36D	TSWTF-1/4-NT	·WRAP (PAC) (L=100mm)	4	
-36E	NO NUMBER	·TWINE (MIL-T-43435, TP-V, SZ-3, FH-C)	AR	
-37	8406F	·COOLER, OIL (S.W)	1	A
	8406E	·COOLER, OIL (S.W)	1	B
	or 200-914070-001	·COOLER, OIL	1	B
	200-914025-001	·BRACKET, OIL COOLER INSTL	1	
	AN3-40	·BOLT	4	
	AN310-3	·NUT	4	
	AN380-2-2	·PIN, COTTER	4	
	AN960-10L	·WASHER	4	
-38	AN833-8D	·ELBOW	2	A
	AN924-8D	·NUT	2	A
	MS28778-8	·"O"RING	2	A
	MS20822-8D	·ELBOW	2	B
-39	200-914131-107	·TUBE ASSY, OIL COOLER	1	A
	200-914131-119	·TUBE ASSY, OIL COOLER	1	B
-40	200-914131-109	·TUBE ASSY, OIL COOLER	1	A
	200-914131-115	·TUBE ASSY, OIL COOLER	1	B
-41	AN919-12D	·REDUCER	1	
-42	200-914131-111	·TUBE ASSY, OIL COOLER	1	A
	200-914131-123	·TUBE ASSY, OIL COOLER	1	B
-43	AN816-8D	·NIPPLE	1	
-44	200-914131-003	·TUBE ASSY, ENGINE BREATHER	1	
-45	200-914131-105	·TUBE ASSY, FUEL PUMP BREATHER	1	
-46	MS20823-4	·ELBOW	1	
-47	F-0454-12038	·HOSE	1	
	AN737PM38	·CLAMP	2	
-48	MS21919DG12	·CLAMP, OIL BREATHER LINE	1	
	AN742D8	·CLAMP, VACCUMPUMP BREATHER LINE	1	
	MS35207-263	·SCREW	1	
	NAS679A3W	·NUT	1	
	AN960-10L	·WASHER	1	
-48A	AN742D12	·CLAMP, OIL BREATHER LINE	1	
	AN742D8	·CLAMP, VACCUMPUMP BREATHER LINE	1	
	MS35207-263	·SCREW	1	
	NAS679A3W	·NUT	1	
	AN960-10L	·WASHER	1	
-48B	MS21919DG4	·CLAMP, ENGINE PUMP BREATHER LINE	1	
	MS21919DG12	·CLAMP, ENGINE MOUNT ASSY	1	
	MS35207-263	·SCREW	1	
	NAS679A3W	·NUT	1	
	AN960-10L	·WASHER	1	
-49	203-914133-011	·RESTRICTOR ASSY	1	E
	AN924-4	·NUT	1	E
	MS29512-04	·"O"RING	1	E
-50	SRC79-4-0420	·HOSE, FUEL PRESSURE	1	E

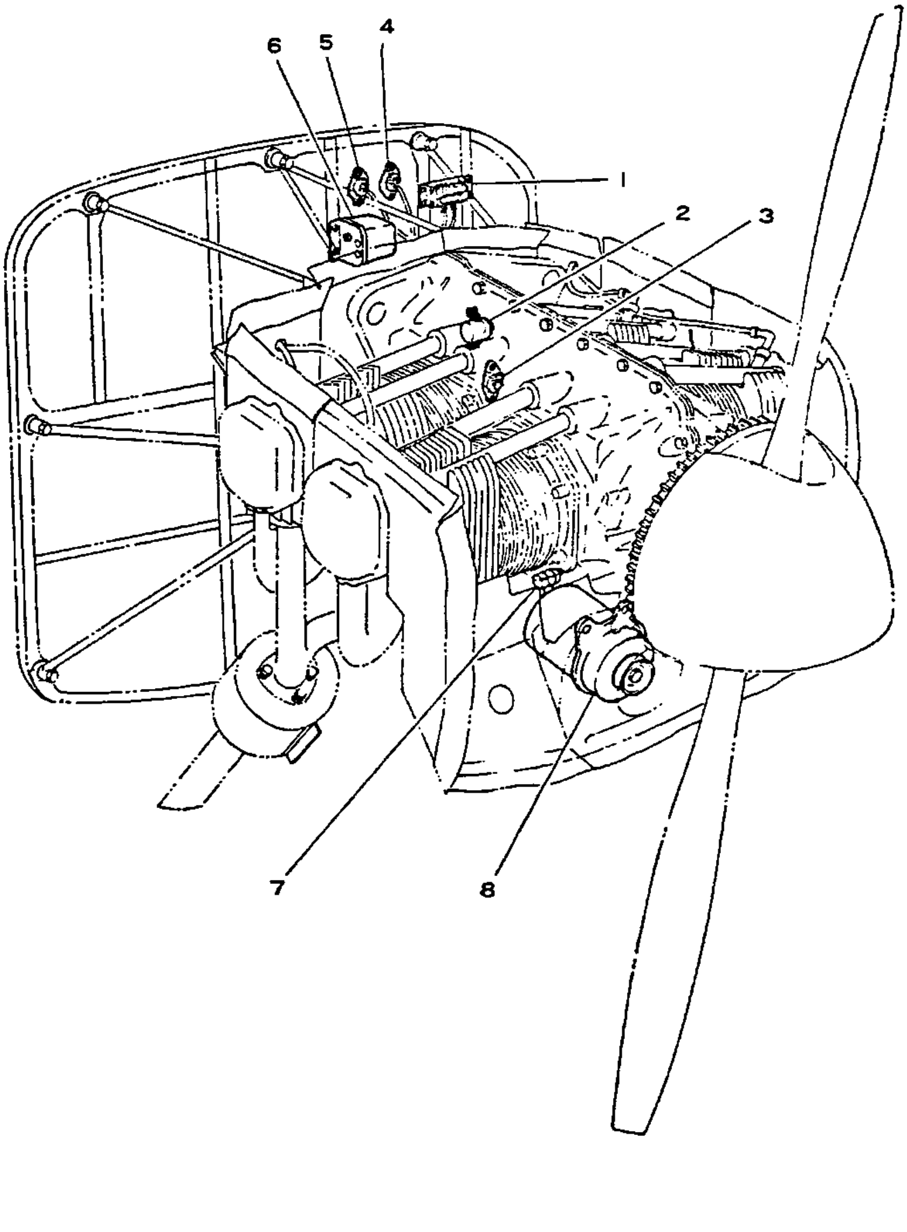


FIGURE 42 ENGINE ROOM ELECTRICAL SYSTEM INSTALLATION

ISSUED : DECEMBER 1971

FIG & INDEX NO.	PART NO.	DESCRIPTION 1234567	UNITS PER ASS'Y	USABLE ON CODE
42	200-364201	ENGINE ROOM ELECTRICAL SYSTEM		
		INSTALLATION	REF	
-1	VSF-7201 or VSF-7202 or VSF-7203 or VSF-7203-S	·VOLTAGE REGULATOR (PRS)	1	
		/ ATTACHING PARTS /		
	AN520-10R12	·SCREW	4	A
	AN960-08	·WASHER	4	B
	MS35206-247	·SCREW	4	B
		.... *		
-2	SAW-4204 or SAW-4217-1 or SAZ-4201E-1	·STARTER RELAY (PRS)	1	
		/ ATTACHING PARTS /		
	AN520-10R10	·SCREW	2	
	AN960-10	·WASHER	2	
		.... *		
-3	F-0446-001	·SHIELD-FIRE WALL	1	
		/ ATTACHING PARTS /		
	F-0456-009	·GROMMET	1	
	MS35489-14	·GROMMET	1	
	MS24621-30	·SCREW	2	
	A1778-8Z3	·NUT	2	
		.... *		
-4	F-0446-001	·SHIELD-FIRE WALL	1	
		/ ATTACHING PARTS /		
	F-0456-009	·GROMMET	1	
	MS35489-11	·GROMMET	1	
	MS24621-30	·SCREW	2	
	A1778-8Z3	·NUT	2	A
		.... *		
-5	F-0446-001	·SHIELD-FIRE WALL	1	A
		/ ATTACHING PARTS /		
	F-0456-009	·GROMMET	1	A
	MS35489-11	·GROMMET	1	A
	MS24621-30	·SCREW	2	A
	A1778-8Z3	·NUT	2	A
		.... *		
-6	10-87998-1 or 10-176487-121	·STARTING VIBRATOR (180HP ONLY) (BX)	1	
		/ ATTACHING PARTS /		
	AN960-8	·WASHER	2	
	MS35206-245	·SCREW	2	
		.... *		
-7	200-364201-601	·CONDENSER ASSY	1	
	4AF-1663	··CONDENSER (SHINKO)	1	
	FVD1.25-6	··TERMINAL	1	
		/ ATTACHING PARTS /		
	AN742-17	·CLAMP	1	
		.... *		
-8	ALZ-8401 or ALZ-8401-R	·ALTERNATOR (12V, 50A) (PRS)	1	
	or ALY-8403	·ALTERNATOR (12V, 60A) (PRS)	1	
	or LW-14308	·ALTERNATOR (12V, 60A) (LYC)	1	
		·ALTERNATOR (12V, 60A) (HET or KEL) ALY-8420	1	
		·ALTERNATOR (12V, 60A) (HET or KEL) ALY-8520	1	
	or LW-14371	·ALTERNATOR (12V, 60A) (LYC)	1	
		A········FOR SERIAL NO.12 THRU NO.156		
		B········FOR SERIAL NO.157 & ON		

FIG & INDEX NO.	PART NO.	DESCRIPTION 1234567	UNITS PER ASS'Y	USABLE ON CODE
32 -10	TM-950016-001	·WASHER	8	
	200-950101-101	·EXHAUST PIPE ASSY	1	B
	200-950101-001	·EXHAUST PIPE ASSY	1	A
-11	200-950116-001	··COVER ASSY	1	
	MS24621-30	··SCREW	7	
	NAS394-14	··NUT	7	
	or A1274-8Z-1			
	MS24621-17	··SCREW	2	
	NAS446-2	··NUT	2	
	or A1181-6Z-1			
-12	200-950102-001	··HEAT EXCHANGER & MUFFLER ASSY	1	
-13	200-950113-101	··EXHAUST MANIFOLD ASSY, NO3 CYL	1	B
	200-950113-001	··EXHAUST MANIFOLD ASSY, NO3 CYL	1	A
-14	200-950111-101	··EXHAUST MANIFOLD ASSY, NO1 CYL	1	B
	200-950111-001	··EXHAUST MANIFOLD ASSY, NO1 CYL	1	A
-15	200-950114-101	··EXHAUST MANIFOLD ASSY, NO4 CYL	1	B
	200-950114-001	··EXHAUST MANIFOLD ASSY, NO4 CYL	1	A
-16	200-950112-101	··EXHAUST MANIFOLD ASSY, NO2 CYL	1	B
	200-950112-001	··EXHAUST MANIFOLD ASSY, NO2 CYL	1	A
-17	FM-950007-001	··JOINT	8	
	AN3C4A	··BOLT	16	
	AN960C10L	··WASHER	32	
	MS21046C3	··NUT	16	
-18	200-914141-001	·SCOOP ASSY, CARB HEATER	1	
-19	F-0470-760600	·DUCT, CARB HEATER	1	B
	F-0470-760500	·DUCT, CARB HEATER	1	A
	AN737TW58	·CLAMP	2	B
	AN737TW66	·CLAMP	1	A
	AN737TW107	·CLAMP	2	
-20	203-914251-051	·AIR INTAKE VALVE ASSY	1	B
	203-914251-101	·AIR INTAKE VALVE ASSY	1	A
-21	200-389012-001	·AIR FILTER	1	
	or 120009	(AMA)		
-22	NAS220-25	·SCREW	4	
	AN960-8L	·WASHER	4	
-23	200-914144-003	·GASKET	1	B
	200-914280-003	·GASKET	1	A
-24	MS20074-04-03	·BOLT	4	
	AN960-416	·WASHER	4	
	MS20995C32	·WIRE	AR	
-25	203-914259-001	·SUPPORT ASSY	1	B
	203-914259-101	·SUPPORT ASSY	1	A
	MS24693-S47	·BOLT	3	
-26	O-360-A5AD	·ENGINE	1	B
	O-320-D2A	·ENGINE	1	A
-27	REM40E	·SPARK PLUG (CHA)	8	
	or SR-88D	·SPARK PLUG (AC)	8	
	or RS-801A	·SPARK PLUG (NGK)	8	
-28	ALZ-8401	·ALTERNATOR, 12V, 50A (PRS)	1	
	or ALY-8403	·ALTERNATOR, 12V, 60A (PRS)	1	
	or LW-14308	·ALTERNATOR, 12V, 60A (LYC)	1	
		·ALTERNATOR, 12V, 60A (HET or KEL) ALY-8420	1	
		·ALTERNATOR, 12V, 60A (HET or KEL) ALY-8520	1	
	or LW-14371	·ALTERNATOR, 12V, 60A (LYC)	1	
		(SEE FIG.36-7)	REF	

FIG & INDEX NO.	PART NO.	DESCRIPTION 1234567	UNITS PER ASS'Y	USABLE ON CODE
32 -29	MZ4206	･STARTER, ENGINE (12V) (PRS)	1	
-30	F-0470-250275	･HOSE, ALTERNATOR COOLING	1	
	AN735-18	･CLAMP	2	
	MS35207-263	･SCREW	2	
	NAS679A3W	･NUT	2	
-31	200-412010-611	･MOUNT ASSY, ENGINE	1	
-32	NAS1305-25D	･BOLT, UPPER	2	
	NAS1305-25 or NAS1305-25D	･BOLT	2	
	NAS1305-28 or NAS1305-28D	･BOLT, CENTER, LOWER	2	
	AN960-516L	･WASHER	6	
	AN960-516	･WASHER	4	
	AN960D516L	･WASHER	2	
	AN310-5	･NUT, UPPER	2	
	MS21042-5	･NUT	4	
	MS24665-136	･PIN, COTTER	2	
-33	200-914053-001	･STRAP, ENGINE BONDING	2	
	AN4-5A	･BOLT	2	
	NAS679A4W	･NUT	2	
	AN960-416	･WASHER	4	
	AN935-416L	･WASHER	2	
	MS35338-44	･WASHER	2	
-34	J-7402-16	･MOUNT, RUBBER, ENGINE (LO)	4	
	NAS1307-50D	･BOLT	4	
	AN310-7	･NUT	4	
	AN960-716	･WASHER	12	
	AN960-716L	･WASHER	12	
	AN380-3-4	･PIN, COTTER	4	
-35	1A170/EFA7658	･PROPELLER (MCL)	1	B
	1C160/FGH7656	･PROPELLER (MCL)	1	A
	MS20995C40	･WIRE, LOCK	AR	
-36	203-960203-051	･BULKHEAD	1	
-37	AN4-11A	･BOLT	12	
	MS21042L4	･NUT	12	
	AN960PD416	･WASHER	12	B
	AN960-416	･WASHER	12	A
-38	203-960202-005	･SPINNER	1	
-39	MS27039-1-10	･SCREW	10	
	AN960-10L	･WASHER	10	
-40	200-411071-101	･COWLING ASSY, UPPER	1	
-41	82-32-101-17	･･SNAPRING (LORD)	6	
	82-11-12-16	･･STUD (LORD)	6	
-42	200-411071-103	･･DOOR ASSY, OIL FILLER	1	
	200-411071-109	･･･HINGE	1	
	200-411071-111	･･･PIN	1	
	H-5000-064-125	･･･LATCH ASSY (HARTWELL)	1	
-43	4002-8	･･STUD (COMLOC)	10	

FIG & INDEX NO.	PART NO.	DESCRIPTION 1234567	UNITS PER ASS'Y	USABLE ON CODE
33		POWER PLANT INSTALLATION	REF	
-1	203-914271-001	·BAFFLE ASSY, ENGINE, L.H FRONT	1	
	MS20074-04-05	·BOLT	2	
	AN960-416	·WASHER	2	
	AN935-416L	·WASHER	2	
-2	203-914273-001	·BAFFLE ASSY, ENGINE, NO2 CYL	1	
	MS20074-04-05	·BOLT	2	
	AN960-416	·WASHER	2	
	AN935-416L	·WASHER	2	
-3	203-914275-001	·BAFFLE ASSY, ENGINE, NO4 CYL	1	
	MS20074-04-05	·BOLT	1	
	AN960-416	·WASHER	1	
	AN935-416L	·WASHER	1	
-4	203-914277-001	·BAFFLE ASSY, ENGINE, L.H AFT	1	
	MS20074-04-05	·BOLT	1	
	AN960-416	·WASHER	1	
	AN935-416L	·WASHER	1	
-4A	203-914285-003	·FITTING	1	
	MS24621-27	·SCREW	4	
	NAS446-4-3 or A1778-8Z-3	·NUT	4	
-5	203-914278-001	·BAFFLE ASSY, ENGINE, R.H AFT	1	
	MS20074-04-05	·BOLT	1	
	AN960-416	·WASHER	1	
	AN935-416L	·WASHER	1	
	MS24621-27	·SCREW	13	
	NAS446-8Z-3 or A1778-8Z-3	·NUT	13	
-6	203-914276-001	·BAFFLE ASSY, ENGINE, NO3 CYL	1	
	MS20074-04-05	·BOLT	2	
	AN960-416	·WASHER	2	
	AN935-416L	·WASHER	2	
-7	203-914274-001	·BAFFLE ASSY, ENGINE, NO1 CYL	1	
	MS20074-04-05	·BOLT	2	
	AN960-416	·WASHER	2	
	AN935-416L	·WASHER	2	
-8	203-914272-001	·BAFFLE ASSY, ENGINE, R.H FRONT	1	
	MS20074-04-05	·BOLT	1	
	AN960-416	·WASHER	1	
	AN935-416L	·WASHER	1	
-9	65321	·GASKET, EXHAUST FLANGE (LYC)	4	
-10	MS51922-11	·NUT	8	
	TM-950016-001	·WASHER	8	
	200-950101-101	·EXHAUST PIPE ASSY	1	
-11	200-950116-001	··COVER ASSY	1	
	MS24621-30	··SCREW	7	
	NAS394-14 or A1274-8Z-1	··NUT	7	
-12	200-950102-001	··HEAT EXCHANGER & MUFFLER ASSY	1	

FIG & INDEX NO.	PART NO.	DESCRIPTION 1234567	UNITS PER ASS'Y	USABLE ON CODE
33 -13	200-950113-101	··EXHAUST MANIFOLD ASSY, NO3 CYL	1	
-14	200-950111-101	··EXHAUST MANIFOLD ASSY, NO1 CYL	1	
-15	200-950114-101	··EXHAUST MANIFOLD ASSY, NO4 CYL	1	
-16	200-950112-101	··EXHAUST MANIFOLD ASSY, NO2 CYL	1	
-17	FM-950007-001	··JOINT	8	
	AN3C4A	··BOLT	16	
	AN960C10L	··WASHER	32	
	MS21046C3	··NUT	16	
-18	203-914251-001	·AIR INTAKE VALVE ASSY	1	
-19	200-389012-001	·AIR FILTER	1	
	or 120009	(AMA)		
-20	NAS220-25	·SCREW	4	
	AN960-8L	·WASHER	4	
-21	203-914257-003	·GASKET	1	
-22	MS20074-04-03	·BOLT	4	
	AN960-416	·WASHER	4	
	MS20995C32	·WIRE	AR	
-23	203-914259-001	·SUPPORT ASSY	1	
	MS24693-547	·BOLT	3	
-24	IO-360-B1B	·ENGINE	1	
-25	REM40E	·SPARK PLUG (CHA)	8	
	or SR-88D	·SPARK PLUG (AC)	8	
	or RS-801A	·SPARK PLUG (NGK)	8	
-26	ALZ-8401 or	·ALTERNATOR, 12V, 50A (PRS)	1	
	ALY-8403	·ALTERNATOR, 12V, 60A (PRS)	1	
	or LW-14308	·ALTERNATOR, 12V, 60A (LYC)	1	
		·ALTERNATOR, 12V, 60A (HET or KEL) ALY-8420	1	
		·ALTERNATOR, 12V, 60A (HET or KEL) ALY-8520	1	
	or LW-14371	·ALTERNATOR, 12V, 60A (LYC)	1	
		(SEE FIG.36-7)	REF	
-27	MZ4206	·STARTER, ENGINE (12V) (PRS)	1	
-28	F-0470-250275	·HOSE, ALTERNATOR COOLING	1	
	AN735-18	·CLAMP	2	
	MS35207-263	·SCREW	2	
	NAS679A3W	·NUT	2	
-29	200-412010-611	·MOUNT ASSY, ENGINE	1	
-30	NAS1305-25D	·BOLT, UPPER	2	
	NAS1305-25	·BOLT	2	
	or NAS1305-25D			
	NAS1305-28	·BOLT, CENTER, LOWER	2	
	or NAS1305-28D			
	AN960-516L	·WASHER	6	
	AN960-516	·WASHER	4	
	AN960D516L	·WASHER	2	
	AN310-5	·NUT, UPPER	2	
	MS21042-5	·NUT	4	
	MS24665-136	·PIN, COTTER	2	
-31	200-914053-001	·STRAP, ENGINE BONDING	2	
	AN4-5A	·BOLT	2	
	NAS679A4W	·NUT	2	
	AN960-416	·WASHER	4	
	AN935-416L	·WASHER	2	
	MS35338-44	·WASHER	2	
-32	J-7402-16	·MOUNT, RUBBER, ENGINE (LO)	4	

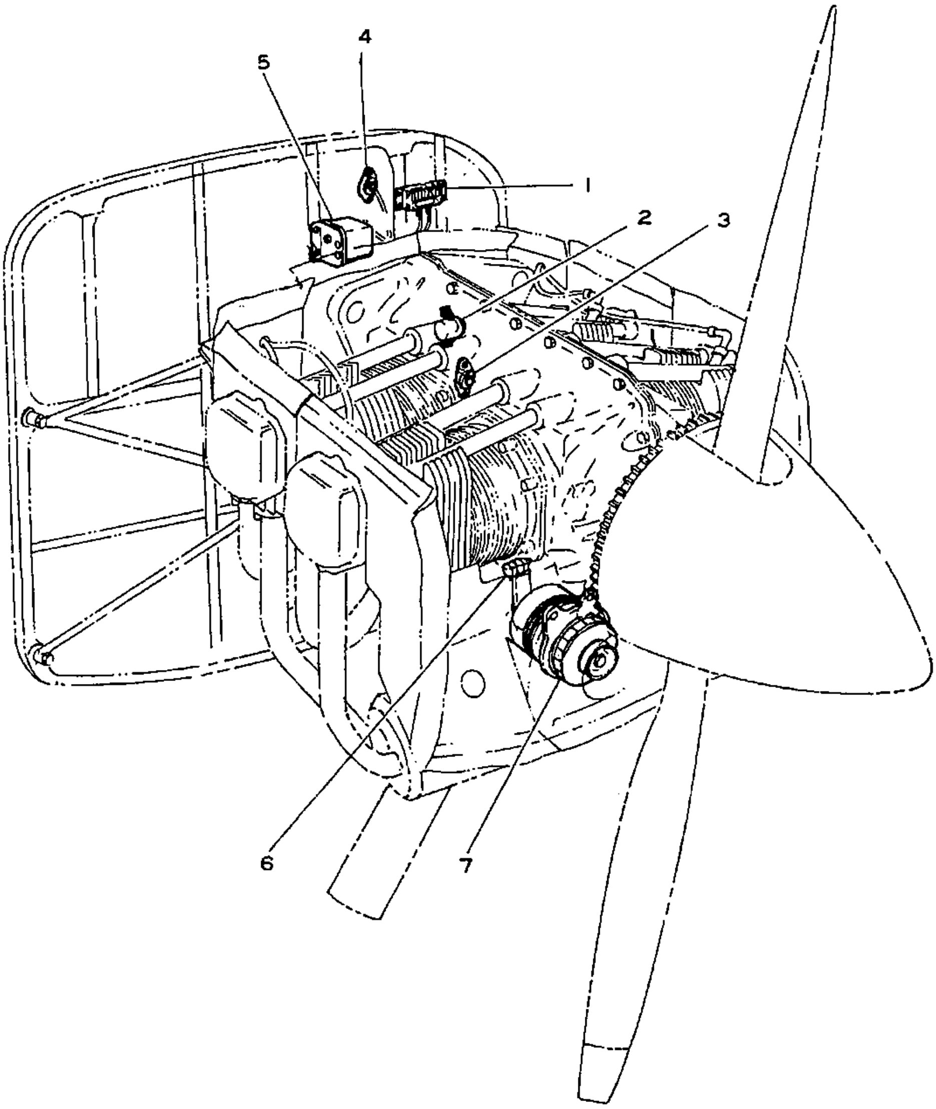


FIGURE 36. ENGINE ROOM ELECTRICAL SYSTEM INSTALLATION

FIG & INDEX NO.	PART NO.	DESCRIPTION 1234567	UNITS PER ASS'Y	USABLE ON CODE
36	200-364201	ENGINE ROOM ELECTRICAL SYSTEM INSTALLATION	REF	
-1	VSF-7201 or VSF-7202 or VSF-7203 or VSF-7203-S	·VOLTAGE REGULATOR (PRS)	1	
		/ ATTACHING PARTS /		
	AN960-08	·WASHER	4	
	MS35206-247	·SCREW	4	
		········ * ········		
-2	SAW-4204 or SAW-4217-1 or SAZ-4201E-1	·STARTER RELAY (PRS)	1	
		/ ATTACHING PARTS /		
	AN520-10R10	·SCREW	2	
	AN960-10	·WASHER	2	
		········ * ········		
-3	F-0446-001	·SHIELD-FIRE WALL	1	
		/ ATTACHING PARTS /		
	F-0456-009	·GROMMET	1	
	MS35489-14	·GROMMET	1	
	MS24621-30	·SCREW	2	
	A1778-8Z-3	·NUT	2	
		········ * ········		
-4	F-0446-001	·SHIELD-FIRE WALL	1	
		/ ATTACHING PARTS /		
	F-0456-009	·GROMMET	1	
	MS35489-11	·GROMMET	1	
	MS24621-30	·SCREW	2	
		········ * ········		
-5	10-87998-1 or 10-176487-121	·STARTING VIBRATOR (180 HP ONLY) (BX)	1	
		/ ATTACHING PARTS /		
	AN960-8	·WASHER	2	
	MS35206-245	·SCREW	2	
		········ * ········		
-6	200-364201-601	·CONDENSER ASSY	1	
	4AF-1663	··CONDENSER (SHINKO)	1	
	FVD1.25-6	··TERMINAL	1	
		/ ATTACHING PARTS /		
	AN742-17	·CLAMP	1	
		········ * ········		
-7	ALZ-8401 or	·ALTERNATOR (12V, 50A) (PRS)	1	
	ALZ-8401-R or ALY-8403	·ALTERNATOR (12V, 60A) (PRS)	1	
	LW-14308	·ALTERNATOR (12V, 60A) (LYC)	1	
		·ALTERNATOR (12V, 60A) (HET or KEL) ALY-8420	1	
		·ALTERNATOR (12V, 60A) (HET or KEL) ALY-8520	1	
	or LW-14371	·ALTERNATOR (12V, 60A) (LYC) (SEE FIG.32-28)	1	